

## WHAT IS CLAIMED IS:

1. A computer-readable medium having thereon computer-executable instructions for performing a method comprising:

determining, for a data sequence, a first set of data sequence breakpoints for a first layer of multiple description coding;

determining, for the data sequence, a second set of data sequence breakpoints for a second layer of multiple description coding; and

encoding the data sequence in a plurality of layers of multiple description coding as a function of, at least:

the first set of data sequence breakpoints; and

the second set of data sequence breakpoints.

2. The computer-readable medium of claim 1, wherein:  
the data sequence comprises a sequence of data subsequences; and

each data subsequence is capable of reducing distortion in a source reproduction by a different amount.

3. The computer-readable medium of claim 1, wherein:  
each layer of multiple description coding is associated with at least one set of communication paths; and

each set of communication paths is associated with a set of communication path characteristics, the set of communication path characteristics comprising:

a communication path bandwidth; and

a communication path data loss characteristic.

4. The computer-readable medium of claim 1, wherein the plurality of layers of multiple description coding comprise:

a first layer of multiple description coding, the first layer of multiple description coding comprising:

an initial part of the data sequence; and

forward error correction code for the initial part of the data sequence; and

a second layer of multiple description coding, the second layer of multiple description coding comprising:

a next part of the data sequence; and

forward error correction code for the next part of the data sequence.

5. The computer-readable medium of claim 4, wherein the second layer of multiple description coding further comprises forward error correction code for the initial part of the data sequence.

6. The computer-readable medium of claim 4, wherein the second layer of multiple description coding further comprises a terminating portion of the initial part of the data sequence.

7. The computer-readable medium of claim 1, wherein determining the first and second sets of data sequence breakpoints comprises optimizing an expected source reproduction distortion measure, the expected source reproduction distortion measure comprising a function of at least one characteristic of each of a plurality of communication paths for at least one of the plurality of layers of multiple description coding.

8. The computer-readable medium of claim 7, wherein optimizing the expected source reproduction distortion measure comprises minimizing the expected source reproduction distortion measure.

9. The computer-readable medium of claim 1, wherein:  
determining the first set of data sequence breakpoints comprises optimizing an expected source reproduction distortion at a first set of candidate decoders, the first set of candidate decoders to receive at least a portion of the first layer of multiple description coding; and

determining the second set of data sequence breakpoints comprises optimizing an expected source reproduction distortion at a second set of candidate decoders, the second set of candidate decoders to receive:

an initial part of the data sequence encoded in the first layer of multiple description coding; and

at least a portion of the second layer of multiple description coding.

10. The computer-readable medium of claim 9, wherein optimizing the expected source reproduction distortion at each set of candidate decoders comprises minimizing the expected source reproduction distortion at each set of candidate decoders.

11. The computer-readable medium of claim 9, wherein the expected source reproduction distortion at the second set of candidate decoders is a function of, at least, a data loss reduction characteristic of forward error correction code for the initial part of the data sequence, said forward error

correction code to be encoded in the second layer of multiple description coding.

12. The computer-readable medium of claim 9, wherein the expected source reproduction distortion at the second set of candidate decoders is a function of, at least, a data loss reduction characteristic of a terminating portion of the initial part of the data sequence, said terminating portion to be encoded in the second layer of multiple description coding.

13. A computer-readable medium having thereon computer-executable instructions for performing a method comprising decoding at least a portion of a distortion-prioritized data sequence from at least one of a plurality of layers of multiple description coding, the plurality of layers of multiple description coding comprising:

- a first layer of multiple description coding, the first layer of multiple description coding comprising:

- an initial part of the distortion-prioritized data sequence; and

- forward error correction code for the initial part of the distortion-prioritized data sequence; and

- a second layer of multiple description coding, the second layer of multiple description coding comprising:

- a next part of the distortion-prioritized data sequence; and

- forward error correction code for the next part of the distortion-prioritized data sequence.

14. The computer-readable medium of claim 13, wherein the second layer of multiple description coding further comprises

forward error correction code for the initial part of the distortion-prioritized data sequence.

15. The computer-readable medium of claim 13, wherein the second layer of multiple description coding further comprises a terminating portion of the initial part of the distortion-prioritized data sequence.

16. A computerized system, comprising a layered multiple description encoder, the layered multiple description encoder configured to, at least:

- determine, for a data sequence, a first set of data sequence breakpoints for a first layer of multiple description coding;

- determine, for the data sequence, a second set of data sequence breakpoints for a second layer of multiple description coding; and

- encode the data sequence in a plurality of layers of multiple description coding as a function of, at least:

- the first set of data sequence breakpoints; and
  - the second set of data sequence breakpoints.

17. The computerized system of claim 16, wherein the plurality of layers of multiple description coding comprise:

- a first layer of multiple description coding, the first layer of multiple description coding comprising:

- an initial part of the data sequence; and

- forward error correction code for the initial part of the data sequence; and

- a second layer of multiple description coding, the second layer of multiple description coding comprising:

a next part of the data sequence; and  
forward error correction code for the next part of  
the data sequence.

18. The computerized system of claim 17, wherein the second layer of multiple description coding further comprises forward error correction code for the initial part of the data sequence.

19. The computerized system of claim 17, wherein the second layer of multiple description coding further comprises a terminating portion of the initial part of the data sequence.

20. The computerized system of claim 16, wherein the layered multiple description encoder comprises a layered multiple description coding optimizer configured to, at least, optimize an expected source reproduction distortion measure, the expected source reproduction distortion measure comprising a function of at least one characteristic of each of a plurality of communication paths for at least one of the plurality of layers of multiple description coding.

21. The computerized system of claim 20, wherein optimizing the expected source reproduction distortion measure comprises minimizing the expected source reproduction distortion measure.

22. The computerized system of claim 16, wherein the layered multiple description encoder comprises a layered multiple description coding optimizer configured to, at least:

optimize an expected source reproduction distortion at a first set of candidate decoders, the first set of candidate decoders to receive at least a portion of the first layer of multiple description coding; and

optimize an expected source reproduction distortion at a second set of candidate decoders, the second set of candidate decoders to receive:

an initial part of the data sequence encoded in the first layer of multiple description coding; and

at least a portion of the second layer of multiple description coding.

23. The computerized system of claim 22, wherein optimizing the expected source reproduction at each set of candidate decoders comprises minimizing the expected source reproduction at each set of candidate decoders.

24. The computerized system of claim 16, wherein:  
each layer of multiple description coding comprises a plurality of packetized descriptions; and

the layered multiple description encoder comprises a layered multiple description coding packetizer configured to, at least, generate the plurality of packetized descriptions for each layer of multiple description coding in accordance with a priority encoding transmission packetization.

25. A computer-readable medium having thereon a data structure comprising a distortion-prioritized data sequence encoded in a plurality of layers of multiple description coding, the plurality of layers of multiple description coding comprising:

a first layer of multiple description coding, the first layer of multiple description coding comprising:

an initial part of the distortion-prioritized data sequence; and

forward error correction code for the initial part of the distortion-prioritized data sequence; and

a second layer of multiple description coding, the second layer of multiple description coding comprising:

a next part of the distortion-prioritized data sequence; and

forward error correction code for the next part of the distortion-prioritized data sequence.

26. The computer-readable medium of claim 25, wherein the second layer of multiple description coding further comprises forward error correction code for the initial part of the distortion-prioritized data sequence.

27. The computer-readable medium of claim 25, wherein the second layer of multiple description coding further comprises a terminating portion of the initial part of the distortion-prioritized data sequence.

28. The computer-readable medium of claim 25, wherein:  
each layer of multiple description coding comprises a plurality of packetized descriptions; and  
each layer of multiple description coding is associated with at least one set of communication paths.

29. The computer-readable medium of claim 28, wherein the plurality of packetized descriptions for each layer of multiple



description coding are formatted in accordance with a priority encoding transmission packetization.

30. The computer-readable medium of claim 25, wherein:  
each layer of multiple description coding is associated with at least one set of communication paths;  
each set of communication paths is associated with at least one communication path characteristic; and  
packetizations of the first and second layers of multiple description coding are a function of, at least, said at least one communication path characteristic of each of said at least one set of communication paths associated with each of the first and second layers of multiple description coding.

31. The computer-readable medium of claim 25, wherein:  
each layer of multiple description coding is associated with at least one set of communication paths;  
each set of communication paths is associated with a data loss characteristic;  
a packetization of the first layer of multiple description coding is a function of, at least, the data loss characteristic of a first set of communication paths; and  
a packetization of the second layer of multiple description coding is a function of, at least, the data loss characteristic of a second set of communication paths.

32. The computer-readable medium of claim 31, wherein:  
the second layer of multiple description coding further comprises additional forward error correction code for the initial part of the distortion-prioritized data sequence; and

the packetization of the second layer of multiple description coding takes into account a data loss reduction characteristic of the additional forward error correction code for the initial part of the distortion-prioritized data sequence.

33. The computer-readable medium of claim 31, wherein:  
the second layer of multiple description coding further comprises a copy of a terminating portion of the initial part of the distortion-prioritized data sequence; and

the packetization of the second layer of multiple description coding takes into account a data loss reduction characteristic of the copy of the terminating portion of the initial part of the distortion-prioritized data sequence.

34. The computer-readable medium of claim 25, wherein:  
the distortion-prioritized data sequence comprises a sequence of data subsequences;

each data subsequence is capable of reducing distortion by a different amount;

data subsequences capable of reducing distortion by greater amounts are ordered so that they are earlier in the distortion-prioritized data sequence;

the initial part of the distortion-prioritized data sequence comprises an initial part of the sequence of data subsequences; and

the next part of the distortion-prioritized data sequence comprises a next part of the sequence of data subsequences.